AMENDMENTS TO THE CLAIMS

1. (Currently amended):   A method of managing resource usage comprising:

pushing commands indicating ~~queuing~~ accesses of at least one resource ~~in associated~~ onto at least one resource queue;

monitoring queue depth in the at least one resource queue for a predetermined level of resource consumption;

preventing issue of subsequent commands from a client of at least one client to a server of at least one server ~~in a client/server combination~~ in response to a command ~~of the client/server combination~~ from the client to the server that increases resource consumption to the predetermined level;

identifying the client and the server for which the command increases resource consumption to the predetermined level as a client/server combination identifier;

pushing ~~an identifier of~~ the client/server combination identifier onto a waiting queue associated with a resource for which the resource consumption is increased to the predetermined level ~~that holds identifiers of client/server combinations~~ , the waiting queue for queuing a plurality of client/server combination identifiers;

detecting a decline in consumption of a resource of the at least one resource;

popping a client/server combination identifier from a waiting queue associated with the resource for which a decline in consumption is detected in order of queuing; and

re-enabling issue of commands from the client to the server designated by the popped client/server combination identifier.

2. (Previously presented): The method according to Claim 1 further comprising:

managing resource usage for clients that require a specific resource.

KOESTNER BERTANI LLP

2192 MARTIN ST
SUITE 150
IRVINE, CA 92612
TEL (949) 251-0250
FAX (949) 251-0260

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3. (Currently amended):   The method according to Claim 1 further comprising:

> enabling issue of commands ~~of~~ <u>from a client to a server identified by</u> a client/server combination <u>identifier</u> in order of queuing as resource availability is restored.

4. (Previously presented): The method according to Claim 1 further comprising:

> receiving a command from a client to a server that increases consumption of a resource to a predetermined resource consumption condition;
> setting a flag indicative of the predetermined resource condition;
> allowing the command to complete; and
> rejecting subsequent commands issued by the client to the server.

5. (Currently amended):   The method according to Claim 1 further comprising:

> detecting an increase in consumption of a resource to a level above a preselected limit; and
> ~~queuing~~ <u>pushing</u> ~~an identifier of~~ the client/server combination <u>identifier</u> on a waiting queue associated with the resource.

6. (Currently amended):   The method according to Claim 5 further comprising:

> detecting a decline in consumption of the resource;
> removing a client/server combination identifier from the waiting queue in the queue order; and
> enabling subsequent commands ~~of~~ <u>from a client to a server identified by</u> the client/server combination <u>identifier</u> removed from the waiting queue for operation.

7. (Original): The method according to Claim 1 implemented in a storage system further comprising:

> at least one storage controller;
> at least one host adapter operational as a client;

KOESTNER BERTANI LLP

2192 MARTIN ST
SUITE 150
IRVINE, CA 92612
TEL (949) 251-0250
FAX (949) 251-0260

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at least one storage array configured as physical storage and logical storage, the logical storage being arranged in logical units (LUNs) operational as servers;

at least one adapter/LUN combination operational as a client/server combination; and

at least one resource selected from a group consisting of dynamic caching structures, queues, buffers, and remote copy resources.

8. (Currently amended):   A storage system comprising:

at least one storage controller controlling data transfers between at least one host adapter and at least one storage array configured as physical storage and logical storage, the logical storage being arranged in logical units (LUNs);

at least one resource utilized in the data transfers;

at least one resource queue respectively associated with the at least one resource that queues commands indicating accesses to the associated resource; and

a logic that pushes commands indicating queues accesses of at least one resource in associated onto at least one resource queue, monitors queue depth in the at least one resource queue for a predetermined resource consumption condition, identifies detects a condition of an adapter that issues commands a command to a LUN in an adapter/LUN combination associated with a command that contributes to the predetermined resource consumption condition, identifying the adapter that issues the command and LUN by an adapter/LUN combination identifier, queues an identifier of pushing the identified adapter/LUN combination identifier on a waiting queue for queuing a plurality of adapter/LUN combination identifiers associated with a resource for which the resource consumption is increased to the predetermined level, and prevents issue of subsequent commands of the identified adapter/LUN combination.

KOESTNER BERTANI LLP
2152 MARTIN ST
SUITE 160
IRVINE CA 92612
TEL (949) 251-0260
FAX (949) 251-0260

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9. (Previously presented): The storage system according to Claim 8 further comprising:

> a logic that detects a decline in resource consumption of a predetermined resource, dequeues the adapter/LUN combination identifier from a waiting queue associated with the predetermined resource for which a decline in consumption is detected, and re-enables commands of the dequeued adapter/LUN combination for operation.

10. (Original):   The storage system according to Claim 8 further comprising:

> at least one resource selected from a group consisting of dynamic caching structures, queues, buffers, and remote copy resources.

11. (Previously presented):   The storage system according to Claim 8 further comprising:

> a logic that manages resource usage for host adapters that require a specific resource.

12. (Previously presented):   The storage system according to Claim 8 further comprising:

> a logic that detects receipt of a command from an adapter to a LUN that increases consumption of a resource above a preselected limit, sets a flag indicative of a predefined condition of the resource, allows the received command to complete, and rejects subsequent commands issued by the adapter to the LUN.

13. (Currently amended): The storage system according to Claim 8 further comprising:

> a logic that detects an increase consumption of a resource above the preselected limit, and queues an ~~identifier of the~~ adapter/LUN combination identifier on a waiting queue associated with the resource.

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14. (Previously presented):   The storage system according to Claim 13 further comprising:

a logic that detects a decline in consumption of the resource, removes an adapter/LUN combination identifier from the waiting queue in the queue order, and enables subsequent commands of the adapter/LUN combination removed from the waiting queue for operation.

15. (Currently amended): A data handling system comprising:

at least one controller controlling data transfers between at least one client and at least one server;

at least one resource utilized in the data transfers;

at least one resource queue respectively associated with the at least one resource that queues commands indicating accesses to the associated resource; and

a logic that pushes commands indicating ~~queues~~ accesses of at least one resource ~~in associated~~ onto at least one resource queue, monitors queue depth in the ~~at~~ least one resource queue for a predetermined resource consumption condition, ~~identifies~~ detects a condition of a source that issues ~~commands~~ a command to a client ~~in a source/client combination associated with a command~~ that contributes to the predetermined resource consumption condition, identifying the source that issues the command and the client by a client/source combination identifier, ~~queues an identifier of~~ pushing the ~~identified~~ source/client combination identifier on a waiting queue for queuing a plurality of client/server combination identifiers associated with a resource for which the resource consumption is increased to the predetermined level, and prevents issue of subsequent commands of the identified source/client combination.

16. (Previously presented):   The system according to Claim 15 further comprising:

a logic that detects receipt of a command from a client to a server that increases consumption of a resource above a preselected limit, sets

KOESTNER BERTANI LLP
2102 MARTIN ST
SUITE 190
IRVINE, CA 92512
TEL (949) 251-0250
FAX (949) 251-0260

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a flag indicative of a predefined condition of the resource, allows the received command to complete, and rejects subsequent commands issued by the client to the server.

17. (Currently amended): The system according to Claim 15 further comprising:

a logic that detects an increase in consumption of a resource above the preselected limit, queues ~~an identifier of the~~ a client/server combination <u>identifier</u> on a waiting queue associated with the resource.

18. (Previously presented):   The system according to Claim 17 further comprising:

a logic that detects a decline in consumption of the resource, removes a client/server combination identifier from the waiting queue in the queue order, and enables subsequent commands of the client/server combination removed from the waiting queue for operation.

19. (Currently amended): An article of manufacture comprising:

a ~~tangible processor usable~~ <u>computer readable</u> medium having a readable program code embodied therein for managing resource usage, the readable program code further comprising:

a code causing a controller to <u>push commands indicating</u> ~~queue~~ accesses of at least one resource ~~in associated~~ <u>onto</u> at least one resource queue;

a code causing the controller to monitor for a predefined level of resource consumption;

a code causing the controller to prevent issue of subsequent commands from a client <u>of at least one client</u> to a server <u>of at least one server</u> ~~in a client/server combination~~ in response to a command ~~of the client/server combination~~ <u>from the client to the server</u> that increases resource consumption to the predefined level;

KOESTNER BERTANI LLP

2192 MARTIN ST
SUITE 150
IRVINE, CA 92611
TOL (949) 251-0290
FAX (949) 251-0260

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<u>a code causing the controller to identify the client and the server for</u>

<u>which the command increases resource consumption to the</u>

<u>predetermined level as a client/server combination identifier;</u>

a code causing the controller to push ~~an identifier of~~ the client/server

combination <u>identifier</u> onto a waiting queue associated with a

resource for which the resource consumption is increased to

the predetermined level ~~that holds identifiers of client/server~~

~~combinations~~ , <u>the waiting queue for queuing a plurality of</u>

<u>client/server combination identifiers;</u>

a code causing the controller to detect a decline in consumption of a

resource of the at least one resource;

a code causing the controller to pop a client/server combination

identifier from a waiting queue associated with the resource

for which a decline in consumption is detected in order of

queuing ; and

a code causing the controller to enable issue of commands from the

client to the server designated by the popped client/server

combination identifier.

20. (Previously presented):   The article of manufacture according to

Claim 19 further comprising:

a code causing the controller to manage resource usage for clients that

require a specific resource;

a code causing the controller to receive a command from a client to a

server that increases consumption of a resource above a

preselected limit;

a code causing the controller to set a flag indicative of a condition of the

resource;

a code causing the controller to allow the command to complete; and

a code causing the controller to reject subsequent commands issued by the

client to the server.

KOESTNER BERTANI LLP

3192 MARTIN ST
SUITE 150
IRVINE, CA 92612
TEL (949) 251-0250
FAX (949) 251-0260

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21. (Currently amended): The article of manufacture according to Claim 19 further comprising:

a code causing the controller to detect an increase in consumption of a resource above a preselected limit;

a code causing the controller to queue ~~an identifier of the~~ a client/server combination identifier on a waiting queue associated with the resource;

a code causing the controller to detect a decline in consumption of the resource;

a code causing the controller to remove a client/server combination identifier from the waiting queue in the queue order; and

a code causing the controller to enable subsequent commands ~~of~~ from a client to a server identified by the client/server combination identifier removed from the waiting queue for operation.

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